STORAGE RESERVOIRS ON THE PROVO RIVER.

1. In as much as this is one of the main factors the affect irrigation from the Provo it is my aim to give a general discription of these reservoirs that may be helpful to those not acquainted with the head of the River.

2. There are now located on the Provo, five storage reservoirs systems; The Union reservoirs, the North Fork reservoirs, the Lost Lake reservoir, the Haystack reservoirs, and the Big Elk Lake reservoir.

3. These were all originally natural lakes that havebeen converted into storage reservoirs by building dams across the outlets to hold the surplus water.

4. The Union reservoir system is located at the head of the main fork of the Provo River approximately 40 miles north and east from Heber and lays almost entirely in Wasatch County at an elevation ranging from 9800 feet to 10,100 feet above sea level.

5. The system grouped according to size follows: Washington Lake with its tributaries Washington No. 2, 3, 4.

6. Wall Lake with five small tributaries Clyde No. 1, 2, 3, and Wall No. 1, 2; and Trial Lake with its four tributaries Star, Diamond, and Montgomery No. 1 and 2.

7. Washington Lake in its natural state has a surface area of approximately 50 acres. The shore line is for the greater part smooth and unbroken, rising from the natural water edge on about a 6% grade for a distance, then steeper. The gentle slope of the shore line tends to increase the surface area very rapidly, as the lake rises so that at a depth of 25 feet above the natural surface the surface

7

area is near 120 acres. At this depth the reservoir commences to discharge water through the spillway. The discharge from this spillway during 1915 before the storage water was released did not exceed 3 second feet. The surface inflow to this reservoir is larger than any of the Union reservoirs being 0.75 second feet at the lowest period observed which was on August 29. The dam across the outlet channel is constructed of earth faced with rock on both sides built on a slope of one and one-half to one; the thickness of the rock on the upper face being about 8 feet at the bottom and 35 feet at the top. The maximum height at present is 35 feet and the present top width is 30 feet. The length is some 500 feet, when completed the top width will be 20 feet. The dam lays north-east and south-east with a slight angle bearing farther to the south on the west end· the water from this reservoir is discharged through a 20 inch pipe controlled by a gatevalve.

8. Of the tributary reservoirs draining through Washington the largest is Washington No. 2 with a surface area of about 14 acres. Washington No. 3 and 4 have each a surface area of about 10 acres. The surplus water in the last three mentioned reservoirs is held back by temporary sod and timber dams that are constructed each year. The amount of water held depending of course upon the height of the dam constructed that season.

9. Wall Lake Reservoir has a natural surface area of about 55 acres. The shore line for the greater part id steep and rocky being almost vertical on the North

8

and West sides, so that there is no considerable increase in the surface area as the lake raises. This is the highest of the three major lakes comprising the Union Reservoir system and is located near the top of the divide between the Provo and the Weber rivers. Mt. Watson lays west. The dam across the outlet is similiar to that of the Washington reservoir being earth faced with rock, with a maximum height of 30 feet and a width of 20 feet and length about 500 feet ~~long~~. When the depth of the water in the reservoir reaches 28 feet above the outlet it commences to discharge through the spillway, a 20 inch pipe is used to regulate the discharge. This reservoir with its tributaries discharges through Trial Lake Reservoir located below. This reservoir filled this season to within one foot of its spillway the surface inflow had entirely ceased on August 27, 1915.

10. The small reservoirs tributary to Wall follow in order according to size, Clyde No. 1 area 11 acres; Clyde No. 2 area 4 acres; Clyde No. 3 area 3 acres; Wall No. 1 area 3 acres and Wall No. 2 area 3 acres. The dams in the outlets to these tributaries are small being rebuilt each year, the storage capacity depending upon the height of the temporary dam.

Trial Lake reservoir is the smallest of the three major reservoirs comprising this system. It has a natural surface area of about 25 acres.

The shore line on the east and north is regular with gentle slope, on the west steeper. The dam across the outlet is constructed the same as the dams on Washington and Wall and had a maximum height of

9

about 35 feet, top width 25 feet and length some 600 feet. This dam has been raised this season. The new spillway is now at a five foot higher level. Tributary to this reservoir are Star Lake with a surface area of approximately 16 acres. Montgomery No. 1 with a surface area of 5 acres; Montgomery No. 2 with a surface area of approximately 2 acres; neither of which are provided with permanent dams.

11. The waters from Wall Lake and Trial Lake reservoirs unite with the discharge from Washington about a quarter of a mile below Trial Lake.

12. The ownership of this system is divided among four companies as follows: Provo Reservoir Company 12/28; Wasatch Irrigation Company 7/28; Timpanogos Irrigation Company 7/28; and The Sego Irrigation Company 2/28.

13. The drawing of storage water from this system was commenced on July 4 of this year probably two weeks earlier than it is tapped during a normal season. Wall Lake reservoir had not filled, being about eighteen inches below the spillway. Washington and Trial reservoirs had been discharging through their spillways for several days.

14. In drawing the storage water this season I adopted the following method: The inflow was observed and a mean adopted for the period of time between observations; this was added to the amount of storage water that it was desired to draw; for example; if the natural inflow was 3 second feet and it was desired to draw 50 second feet of storage then the discharge from the reservoirs was kept at 53 second feet. I

10

made four trips to these reservoirs between July 2 and August 30 and made careful observations on inflow each time this method insured to the defendant rights, the actual natural inflow that they were entitles to. This method was used on all reservoirs this season. The discharge from this system this season was measured over a concrete suppressed weir 19 feet wide and three feet high; gage readings were taken and any variation in the flow was at once corrected. There were two men imployed at the reservoirs this season reading gage and regulating discharges etc. The work done by these two men (Messrs Clyde and Clegg) was very satisfactory; at all times this season. I found these men faithfully attending to their duties and carrying out my instructions.

15. During 1915 the Timpanogos Irrigation Company began to draw their portion of the storage on July 6 and continued until July 25 when their portion was exhausted. The Wasatch Irrigation Company began to draw water on July 9 and continued until August 9. The Provo Reservoir Company and Sego Irrigation Company began to draw water on July 6 and continued until September 6. This includes the water drawn from the Provo Reservoir Company's other reservoir systems. The dates as given above are at the Wasatch Dam. (For details showing daily discharge capacity, etc., see attached sheets)

16. The total storage drawn from the Union Reservoirs the past season was 4,400 acre feet.

17. The North Fork system is located at the head of the North Fork of the Provo River about 2 miles west from Washington Reservoir. It lays entirely in Summit County at an altitude ranging from 10,000 to10,200 feet

above sea level. This system consits of 6 small natural lakes #1 to 6, ranging in area from approximately 4 to 20 acres that have been converted into storage reservoirs by dams built across the outlets. The dams are from 20 to 200 feet in length. The discharge is through pipes controlled by gates. This system cannot be developed to any great extent because of the prohibitive cost and the limited size of the water shed. It can, however, be increased to hold three or four times its present capacity at a nominal expense.

There was some work done on this system this season. With the exception of No. 5 which has steep and rocky shores the shore lines of these reservoirs are for the greater part smooth and gentle. The reservoirs are of comparatively shallow depth. The waters from this system discharge into the North Fork of the Provo which joins the main river about fifteen miles below Washington Lake and about 25 miles from Heber.

18. North Fork reservoirs 4 and 5 discharge through No. 6. Number 3 discharges through N. 2 and No. 1 has its own outlet. The amount of water stored in this system during the past season amounted to 166 acre feet. There are no devices for measuring the discharge from this system. These should be provided before the begining of another season and placed as closely to the outlets of the several lakes as possible. This system is owned by the Provo Reservoir Company exclusively and is the second largest system owned by them.

19. The Lost Lake system lies entirely in Wasatch County about one mile south and east from Trial Lake at an elevation ranging from 9,800 to 9,900 feet above sea level. It is made up of three small lakes varying in size the largest being about 25 acres and the smallest being about four acres. The waters of Lost Lake and Lost Lake No. 2 are held by rockfaced dams; that of No. 1 is held by a temporary sod dam. Therock dams are from 6 to 10 feet high and from 100 to 300 feet long. The discharge being released through pipes controlled by gates.

20. These reservoirs drain through eachother and empty into the main fork of the river about one mile below Trial Lake. The shore lines of Lost Lake and Lost Lake No. 1 are smooth with a gentle slope probably not exceeding 3% The slopes of No. 2 are steep and rocky.

21. A break occured in Lost Lake dam early in 1915 resulting in a loss of considerable of the storage water as it was not repaired in time this season to hold back the bulk of the flood waters. This dam has been repaired and raised a small amount since the reservoir emptied so that the capacity has been increased, The water stored in this system is 1915 amounted to 229 acre feet. Since these reservoirs have been drained there has been a weir built just below the oultlet of Lost Lake. This system is owned by the ProvoReservoir Company and is the largest of the systems owned exclusively by them.

22. The Haystack system is made up of three reservoirs No. 1, 2 and 3 and is located in Summit County about one mile south of Washington Lake Reservoir at an

12

altitude of about 9,800 feet. The area of the reservoirs is from 4 to 10 acres. The shore lines are smooth with but very light slope. They are of shallow depth.

23. The storage capacity could probably be doubled or quadrupled at a small expense beyond that the cost of dams would likely be too great to justify the amount of water stored. These reservoirs have sod and timber dams across the outlets that are constructed each year, these dams are from two to three feet high. All have separate outlets that discharge into the main river about five miles below Trial Lake. The amount stored this year was 45 acre feet. The system is owned by the Provo Reservoir Company.

24. The Big Elk Lake reservoir is located at the head of Boulder Canyon in Summit County about five miles west from the Union Reservoirs, and about 35 miles north east of Heber. The elevation is approximately 10,000 feet. The natural surface area is about 40 acres. As is the case with the other reservoirs on the Provo river this is a natural lake that has been converted into a storage basin by a rock faced dam holding the flood waters. The dam has a maximum height of 30 feet., top width 15 feet and length of 300 feet. The water discharges through a 1 foot 6 inch by 2 foot concrete conduit and is controlled by a sliding steel gate. The shore lines on the north and west are steep and rocky being flatter on the east. It is said that the depth in the center when the lake is at its natural level is 90 feet. The waters from this reservoir empty into Boulder Canyon, a tributary of the North Fork of the Provo, Boulder Canyon joins the North Fork about 6 miles below

13

altitude of about 9,800 feet. The area of the reservoirs is from 4 to 10 acres. The shore lines are smooth with but very light slope. They are of shallow depth.

23. The storage capacity could probably be doubled or quadrupled at a small expense beyond that the cost of dams would likely be too great to justify the amount of water stored. These reservoirs have sod and timber dams across the outlets that are constructed each year, these dams are from two to three feet high. All have separate outlets that discharge into the main river about five miles below Trial Lake. The amount stored this year was 45 acre feet. The system is owned by the Provo Reservoir Company.

24. The Big Elk Lake reservoir is located at the head of Boulder Canyon in Summit County about five miles west from the Union Reservoirs, and about 35 miles north east of Heber. The elevation is approximately 10,000 feet. The natural surface area is about 40 acres. As is the case with the other reservoirs on the Provo river this is a natural lake that has been converted into a storage basin by a rock faced dam holding the flood waters. The dam has a maximum height of 30 feet., top width 15 feet and length of 300 feet. The water discharges through a 1 foot 6 inch by 2 foot concrete conduit and is controlled by a sliding steel gate. The shore lines on the north and west are steep and rocky being flatter on the east. It is said that the depth in the center when the lake is at its natural level is 90 feet. The waters from this reservoir empty into Boulder Canyon, a tributary of the North Fork of the Provo, Boulder Canyon joins the North Fork about 6 miles below

K3

the reservoir. This is owned by the Washington Irrigation Company of Kamas. The storage capacity is not definitely known. During 1915 it did not fill by about 10 feet. The storage this season amounted to 660 acre feet. While the storage water was being drawn a man was kept at the reservoir to regulate the outflow which was kept to a gage set by me. The drawing of storage water was commenced on July 11 and ended on August 1.

25. The benefits derived from these reservoirs this past season cannot be estimated. It is very probably that had it not been for this storage water that crops in some districts would have been a complete failure. I may mention the lands under the Timpanogos canal at Heber and those under the Washington canal near Kamas. Another fact that can not be passed by is the benefit to other users of the seepage return from this storage water.